

PC-088

Evaluating the Effects of Different Cognitive Tasks on Sympathetic Responses: Implementation of a High-Precision, Low-Cost Complementary Method

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AIM: In this study, we aimed to design a low-cost and user-friendly complementary research tool to evaluate sympathetic stress response at different cognitive workload levels and determine its effect on reaction time. Visual stimuli were used as cognitive tasks and applied through a specially designed computer-based separate test battery. Electrodermal activity (EDA), a non-invasive peripheral indicator of sympathetic nervous system activity, was used to assess sympathetic stress response. Additionally, electrocardiogram (EKG) recording was conducted to evaluate heart rate and heart rate variability (HRV) as central parameters of sympathetic nervous system activity. Cognitive tasks were synchronized with EDA and EKG recording systems. At the end of the experiment, the collected data were analyzed, and the correlation between the records was evaluated.

METHODS: Ten healthy adults, aged 20 to 40, were selected for the preliminary study. Hand preference and color blindness were assessed. EDA recordings were made. A computer-based system specially designed for visual stimuli was used. Participants were asked to perform a button-pressing task when they saw the target stimulus, and the relationship between reaction time and cognitive load during tasks was evaluated. Additionally, data recorded through EDA and EKG were utilized to assess the activity of the sympathetic nervous system during tasks of varying difficulties.

RESULTS: An increase in reaction time has been observed with task difficulty. Additionally, in tasks that lead to a higher cognitive load compared to the resting state, there has been a noticeable but not statistically significant rise in EDA. Moreover, the correlation between EDA changes and HRV parameters is observed to be relatively weak.

CONCLUSION: An increase in reaction time with task difficulty shows its connection to decision-making complexity and alertness. Insignificant EDA rise and weak EDA-HRV correlation may be due to the small participant number, prompting a plan to increase the sample size in the continuation of study.

Keywords: Cognitive tasks, Sympathetic responses, Complementary method, Reaction time.

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Changes in Physiological Parameters During Everest Base Camp Trek

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AIM: The ascent of Mount Everest, the world's highest peak, stands as an extraordinary challenge that pushes human physiological limits to their extremes. As individuals venture into the thin air of high altitudes, their bodies undergo physiological adaptations to cope with the harsh environmental conditions characterized by decreased oxygen availability, extreme cold, and reduced atmospheric pressure. This study aims to examine the changes in various physiological parameters exhibited by climbers during their ascent to Mount Everest.

METHODS: The study group consisted of 4 volunteers (n=4), 53/F, 65/M, 52/M and 57/M. During Everest Base Camp (EBC) trek, physiological parameters such as partial oxygen pressure (SpO₂), heart rate (HR), systolic and diastolic blood pressures (SBP and DBP) were measured three times a day whilst selective attention task performance (SATP) was tested on a daily basis. The same parameters were also evaluated at the sea level 6 months after the initial climb to Mount Everest in order to compare learning curves on selective attention test. Nonparametric statistical and correlation analysis were performed and p<0,05 was selected as significance level.

RESULTS: Mean SpO₂ decreased significantly compared to sea level and mean HR, SBP and DBP increased (p<0.05). SATP, specifically inattention and visual processing speed, increased day by day during EBC walking, but this performance was found to be significantly lower than performance at sea level (p<0.05). As SBP and DBP increased, inattention decreased and visual processing speed increased (p<0.05).

CONCLUSION: In conclusion, our findings show the negative effects of decreasing oxygen amount, extreme cold and decreasing atmospheric pressure on parameters such as blood partial oxygen pressure, heart rate, blood pressure, selective attention and visual processing speed. We also observed that high blood pressure ameliorated the decrease in attention and visual processing speed in extreme conditions during EBC walking.

Keywords: Physiological adaptations, Mount Everest ascent, High-altitude environment, Oxygen availability, Selective attention.

PC-090

The Relationship between Injury Risk and Cognitive Function in Adolescent Football Players

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AIM: Adolescence is considered a risky period for sports injuries. Among team sports, football has the highest injury risk. The aim of this study is to investigate the relationship between cognitive function and injury risk in adolescent football players.

METHODS: 93 licensed and right-handed male soccer players aged 10-14 (12.06±1.29) who have been playing football for at least 1 year were included in the study. Attention, short-term memory